

REMARKS

Claims 1-9 and 21-27 were previously pending in the application. Claims 21-27 were withdrawn unilaterally by the Examiner. Claims 1-9 have been rejected. Claims 21 to 27 have been canceled and rewritten purely as dependent claims 30 to 36. Also new dependent claims 28 to 29 have been added. Claim 1 (the sole independent claim) herewith is amended. Dependent claims 3-9 have also been amended to correct a minor informality. Claims presently active are, therefore, claims 1-9 and 28-36. Favorable reconsideration of the application in view of the following remarks is respectfully requested.

Applicants traverse the Examiner's withdrawal of claims 21 to 27, since the independent claim 21 from which claims 22-27 depend, included all the limitations of claim 1, but was narrower in there only being two populations rather than at least two populations of domains. Moreover, claim 21 was essentially merely the combination, in independent form, of claim 6 and claim 1 from which claim 6 depended. In any case, as stated above, the subject matter of claims 21 to 27 have been written as purely dependent claims 30 to 36.

The Examiner's comments together with the cited references have been carefully studied. Favorable reconsideration in view of the foregoing amendments and following remarks is respectfully requested.

Relying on 35 U.S.C. §102(b), the Examiner rejected claims 1-9 as being anticipated by Stephenson. The Examiner states as to claim 1 as follows:

As to claim 1, Stephenson discloses a display sheet (fig. 5, ref. 10) comprising an optional substrate (30) for carrying layers of material, an imaging layer (11) and comprising a substantial monolayer of isolated domains of liquid-crystal material dispersed in a continuous matrix, said liquid-crystal material (12, 14) having a first reflecting state within the visible light spectrum defining an operating spectrum and a second weakly scattering state in said operating spectrum, wherein said states are capable of being interchanged by an electric field, which states are capable of being maintained as a stable state in an absence of an electric field (col. 4, lines 1-9), wherein said domains of liquid-crystal material comprises a mixture of at least two populations, a first population comprising a first liquid-crystal material having a first λ_{max} and a second liquid-

crystal material having a second λ_{max} wherein there is a difference between said first and said second λ_{max} of at least 50 nm (referring to yellow and blue populations, col. 6, lines 14-23), first transparent conductors (32) disposed on one side of said imaging layer, second conductors (40) disposed on an opposite side of said imaging layer.

Furthermore, in response to Applicant's comments, the Examiner states as follows:

....Applicant argues that "Stephenson teaches that domains or droplets of liquid crystal in the light-modulating layer are smaller than the thickness of the layer so that multiple domains overlap, contrary to Applicants' invention. In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which the applicant relies...are not recited in the rejected claim(s). Although claims are interpreted in light of the specifications, limitations from the specification are not read into the claims....

Applicants respectfully traverse the Examiner's interpretation of claim 1. The Examiner has ignored the explicit definition of the term "substantial monolayer," which term is in the claim. The MPEP clearly states: "A term used in the claims may be given a special meaning in the description." [MPEP 608.01(o), 2111.01 and 2173.05 (a)] "The words of a claim must be given their "plain meaning" unless they are defined in the specification." See especially MPEP 2111.01. "This means that the words of the claim must be given their plain meaning unless applicant has provided a clear definition in the specification. In re Zletz, 13 USPQ2d 1320, 1322 (Fed. Cir. 1989) etc. Furthermore, "Applicant may be own Lexicographer," MPEP 2111.01 (III): "Where an explicit definition is provided by the applicant for a term, that definition will control interpretation of that term as it is used in the claim." See also MPEP 2173.05(a): "When the specification states the meaning that a term in the claim is intended to have, the claim is examined using that meaning, in order to achieve a complete exploration of the applicant's invention and its relation to the prior art."

Furthermore, in Applicants' amendment of November 14, 2005, Applicants clearly pointed out the definition of the term in question and how it distinguished from the prior art.

In order to obviate any further issue, however, Applicant has incorporated the definition of the term in question into claim 1, as supported in the original specification on page 12, lines 16-27.

Importantly, Stephenson teaches that domains or droplets of liquid crystal in the light-modulating layer are smaller than the thickness of the layer so that multiple domains overlap, contrary to Applicants' invention. As stated by Stephenson, in column 6, lines 66-67: "The domains of liquid crystal in light modulating layer 11 are smaller than the layer thickness so the multiple domains overlap." This is readily apparent by viewing Figure 5 of Stephenson. Moreover, Stephenson does not mention anything about the effect of using mixtures of domains on the back-scattered intensity in the focal conic state and, hence, does not achieve the advantageous results obtained by the present invention.

The present Applicants have unexpectedly found that the contrast of a display of the type disclosed and claimed is degraded if there is more than a substantial monolayer of cholesteric liquid crystal domains.

Furthermore, Example 1 in the present specification experimental shows the influence of laydown of the liquid-crystal material on backscattering from the focal conic state and contrast of the display. Referring to Fig. 5, the percent reflectance as a function of wavelength for three different laydowns of the LC material is shown. The full line, dashed line and dotted line correspond to coverages of 53.8, 129.2, and 161.5 cm³/m² (5, 12 and 15 cm³/ft²) respectively. It is clear that the level of back scattering in the focal conic state increases significantly as the laydown is increased beyond monolayer coverage, as explained in Example 1. It is clear that the contrast ratio is much lower at laydowns greater than a monolayer of the LC droplets because of a significant increase in backscattering in the focal conic state.

Similarly, Example 2 in the present specification experimentally shows that the method of the invention allows broadband features to be obtained with little increase in backscattering in the focal conic

state and, therefore, excellent contrast between the bright and dark states of the display.

Furthermore, the experimental evidence shows superior results when the different populations of domains reflect (i.e. have a peak reflectance or λ_{\max}) in the green and red parts of the spectrum wherein the different parts of the spectrum are defined as follows: blue, below 480 nm; green, 480 to 560 nm; yellow, 560 to 590 nm; orange, 590 to 630 nm; red, 630 to 720 nm; and IR, above 720 nm. Thus, present claims 3, 5, 6, 7, and 30 to 36 are directed to a display of the present invention, in which the peak reflected wavelength of a first material in a first domain population is 450 to 560 nanometers and the peak reflected wavelength of a second material in a second domain population is 561 to 720 nanometers. More particularly, the imaging layer of these claims comprises a mixture of substantially just two different liquid crystal materials, in two different populations of domains, one of which reflects in the red spectrum. The advantage of such a mixture is shown in Fig. 7 which is a plot of the percent reflectance in the planar reflective states and the weakly scattering focal conic states. Fig. 7 shows comparatively increased broadband with little increase in backscattering for a display according to the present invention (Example 2) having a combination of green and red domains. In contrast, Stephenson discloses the combination of yellow and blue domains when limited to two types of domains, contrary to the present invention. Thus, Stephenson further teaches away from the present invention of claims 3, 5, 6, 7, and 30 to 36.

Applicants therefore respectfully request that the Examiner reconsider and withdraw the rejection of the claims under 35 U.S.C. §102(b).

In view of the foregoing remarks and amendment, the claims are now believed allowable and such favorable action is courteously solicited.

Should the Examiner consider that additional amendments are necessary to place the application in condition for allowance, the favor is requested of a telephone call to the undersigned counsel for the purpose of discussing such amendments.

Respectfully submitted,



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